

Katarzyna Borowiec

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Education

University of Illinois at Urbana-Champaign

Illinois, USA

PH.D. IN NUCLEAR, PLASMA, AND RADIOLOGICAL ENGINEERING

Jan. 2018 - May 2021

- Dissertation: *Advanced Framework for Assessment and Reduction of Model Form Uncertainty of the Closure Laws in Thermal-Hydraulics Codes*

University of Illinois at Urbana-Champaign

Illinois, USA

M.S. IN NUCLEAR, PLASMA, AND RADIOLOGICAL ENGINEERING

Aug. 2016 - Dec. 2017

- Thesis: *Molecular Dynamics Simulation of Pool Boiling Process*

University of Warsaw

Warsaw, Poland

B.SC. IN PHYSICS

Oct. 2013 - June 2016

- Thesis: *Investigation of Single Particle States with Woods-Saxon Potential*

Warsaw University of Technology

Warsaw, Poland

B.SC.ENG IN POWER ENGINEERING

Oct. 2012 - Feb. 2016

- Thesis: *Investigation of Temperature Reactivity Coefficient in EOLE Reactor*

Experience

Oak Ridge National Laboratory

Oak Ridge, USA

POSTDOCTORAL RESEARCH ASSOCIATE

2021 - present

Research projects:

- CFD modeling of the High Flux Isotope Reactor.
- Fusion Energy Reactor Models Integrator, FERMI project.

University of Illinois at Urbana-Champaign

Illinois, USA

GRADUATE RESEARCH ASSISTANT

Aug. 2016 - May 2021

Research projects:

- Investigation of TRACE Closure Laws Accuracy in Modeling BWR ATWS in MELLLA+ Domain Using Uncertainty Quantification Methods.
- Modeling and Analysis of Exelon BWRs for Eigenvalue & Thermal Limits Predictability.
- Methods for Large System Code Performance Evaluation and UQ using TRACE Code.
- Validation of RELAP-7 for Forced Convective and Natural Circulation Reactor Flows.

Oak Ridge National Laboratory

Oak Ridge, USA

GRADUATE INTERN

June 2019 - Aug. 2019

Research projects:

- Thermal-Hydraulics Coupling of CTF and TRACE System Code.

Oak Ridge National Laboratory

Oak Ridge, USA

GRADUATE INTERN

May 2018 - Aug. 2018

Research projects:

- Modeling of Thermal Storage for Nuclear Power Plants.

Computational Skills

TH codes:

TRACE, RELAP5, CTF, ANSYS Fluent

Neutronics Codes:

SCALE, SERPENT

Programming:

JavaScript, R, Python, Matlab, VBA, C, C++, Fortran, Modelica, OpenMP, MPI

Other:

Cluster computing, LaTeX, Git, Mathematica, LAMMPS, Bash

Publications

Borowiec, K., Wysocki, A., and Kozlowski, T., "Comprehensive framework for data-driven model form discovery of the closure laws in thermal-hydraulics codes." *International Journal of Heat and Mass Transfer* 170 (2021): 120976

Borowiec, K., Wysocki, A., Shaner, S., Greenwood, M.S., Ellis, M., "Increasing Revenue of Nuclear Power Plants with Thermal Storage," ASME. J. Energy Resour. Technol. April 2020; 142(4): 042006

Borowiec, K., Kozlowski, T., Brooks C.S., "Validation and Uncertainty Quantification for Two-Phase Natural Circulation Flows using TRACE code," Nuclear Science and Engineering, February 2020.

Radaideh, M.I., Borowiec, K., Kozlowski, T., "Integrated Framework for Model Assessment and Advanced Uncertainty Quantification of Nuclear Thermal-hydraulics System Codes Under Bayesian Statistics," Reliability Engineering & System Safety. September 2019; 189, 357-377.

Brooks, C.S., Kozlowski, T., Ooi, Z.J., Borowiec, K., Wang, C., Kumar, V., Zou, Zhang, H. L., Golchert, B. M., "Validation of RELAP-7 for Forced Convective and Natural Circulation Reactor Flows" Technical Report, Project ID: DOE-16-10630, 2020.

CONFERENCE PROCEEDINGS

Borowiec, K., Kozlowski, T., "Discovery of Missing Physics in The Closure Laws Using Data-Driven Approach" *Accepted In: Proceeding of Best Estimate Plus Uncertainty International conference*, Giardini Naxos, Italy, May 30-June 5, 2021.

Borowiec, K., Pigg, C., Kozlowski, T., "Analysis of Sensitivity and Uncertainty Quantification for Transient Simulation with the Emphasis on Changes in the Transient Structure," *In: Proceedings of 18th International Topical Meeting on Nuclear Reactor Thermal Hydraulics, NURETH 2019*, Portland, OR, August 18-23, 2019.

Radaideh, M. I., Borowiec K., and Kozlowski T.. "Uncertainty Quantification of Model-form and Predictive Uncertainties in Nuclear Codes using Bayesian Framework," *In: Proceedings of 2019 International Conference on Mathematics and Computational Methods Applied to Nuclear Science and Engineering, M&C 2019*, Portland, OR, August 25-29, 2019.

Borowiec, K., Kozlowski, T., "Inverse Uncertainty Quantification of TRACE Physical Model Parameters using BFBT Benchmark with Investigation of Measurement Bias," *In: Proceedings of ANS Annual Meeting 2018*, Philadelphia, PA, June 17-21, 2018.

Wang, C., Wu, X., Borowiec, K., Kozlowski, T., "Bayesian Calibration and Uncertainty Quantification for TRACE based on PSBT Benchmark," *In: Proceedings of ANS Annual Meeting 2018*, Philadelphia, PA, June 17-21, 2018.

Borowiec, K., Kozlowski, T., "Modeling of Measurement Uncertainty in Inverse Uncertainty Quantification of TRACE Physical Model Parameters using BFBT Benchmark," *In: Proceeding of Best Estimate Plus Uncertainty International conference*, Lucca, Italy, May 13-18, 2018.

Borowiec, K., Wang, C., Kozlowski, T., Brooks, C.S., "Uncertainty Quantification for steady-state PSBT Benchmark using Surrogate Models," *In: Proceedings of ANS Winter 2017*, Washington, DC, October 29-November 2, 2017.

Software Development

2019 - 2020	CTF	ROMs and improvements to closure laws
2019	TRACE	Work with External Coupling Interface (ECI)
2019	CTF	Design and implementation of TRACE coupling interface
2017 - 2020	TAPE	Development of Python based UQ and SA tool

Teaching Experience

2018	Spring	Teaching Assistant, Nuclear Power Engineering
2017	Spring	Teaching Assistant, Modeling Nuclear Energy System
2016	Fall	Teaching Assistant, Modeling Nuclear Energy System

Honors and Awards

2015	GE Foundation Scholarship, Scholar-Leaders program
2013	Dean's scholarship, Warsaw University of Technology